Abstract Submitted
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Fluorescence spectrum of a strongly driven single trapped ion in a cavity[1] LE LUO, ANDREW MANNING, JONATHAN STERK, CHRIS MONROE, JQI, University of Maryland and NIST, College Park, MD 20742, PETER MAUNZ, ECE Department, Duke University, Durham, NC 27708 — A single trapped ytterbium ion inside a 2 mm optical cavity has been used to study the emission spectrum of a strongly driven atom-cavity system in the intermediate coupling regime. By driving the atom from the side of the cavity with a coherent laser field, the fluorescence emitted into an undriven cavity mode is observed. The cavity emission spectra are produced by scanning the cavity length for various driving strengths and laser-atom detunings. We observe the emergence of a three-peak feature of the spectrum at higher driving strengths that differs significantly from the normal single peak under weak excitation. We find that a simple convolution of the free-space Mollow triplet with the cavity transfer function does not sufficiently describe the observed spectrum, necessitating a more complete treatment by solving a strongly driven Jaynes-Cummings model with dissipation.

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